ABSTRACT OF THE INVENTION

The invention provides methods and compositions for heavy metal phytoremediation, including plants which are genetically engineered to overexpress glutamylcysteine synthetase (ECS) and thereby provide enhanced heavy metal accumulation. In various embodiments, the plants comprise a gene encoding ECS operably linked to a heterologous promoter, the plant is a member of the Brassicaceae family. In general, the methods comprise the steps of growing such plants in a medium such as soil or water comprising a heavy metal, under conditions wherein ECS is overexpressed, whereby the plant provides enhanced accumulation of the heavy metal, whereby the heavy metal content of the medium is decreased.